

REMARKS

By the foregoing Amendment, Claims 1, 2, 25, 31, 37, 50, 52 and 53 are amended and Claims 3-5, 7, 54, 55 and 57 are cancelled. Entry of the Amendment, and favorable consideration thereof, is earnestly requested. Claims 3-5, 7, 54, 55 and 57 being cancelled herein, and Claims 10-13, 27, 32, 51 and 58 having been previously cancelled, Claims 1, 2, 6, 8, 9, 14-26, 28-31, 33-50, 52, 53 and 56 are currently pending.

Claim 37 was rejected under 35 U.S.C. 112, second paragraph, as depending from a cancelled base claim. Claim 37 has been amended to depend from Claim 1, which Applicant believes obviates this rejection.

Claim 1 has been amended to read as follows:

1. Chewing gum comprising:
at least one biodegradable polymer having a molecular weight within the range of at least 105000 g/mol (Mn) to 350000 g/mol (Mn); and
at least one softener in an amount of less than 12% by weight of the chewing gum;
wherein the chewing gum is free of non-biodegradable polymers.

The amended Claim 1 is a combination of old Claims 1 and 5, now cancelled, and the Summary, page 6, lines 16-18 of the present application.

Claim 50 has been amended to read as follows:

50. Method of creating a chewing gum with increased robustness comprising the steps of:
 providing at least one biodegradable polymer;
 adjusting the molecular weight of the at least one biodegradable polymer to be within the range of at least 105000g/mol (Mn) to 350000 g/mol (Mn); and
 mixing the at least one biodegradable polymer with at least one ~~other chewing gum~~ softener in an amount of less than 12% by weight of the chewing gum component.

Claim 50 has been amended by combination with Claim 55, now cancelled, and the softener amount given in the Summary page 6, lines 16-18 of the present application.

Claims 2, 52 and 53 have been amended to include the upper limit of the molecular weight range of amended claims 1 and 50. Claims 25 and 31 have been amended to correct clerical errors. In addition to Claims 5 and 55, Claims 3, 4, 7, 54 and 57 have been cancelled.

Response to Prior Art Rejections

Grijpma et al. in view of Ohara et al.

Claims 1-9, 14-18, 20-26, 28-31, 33-39, 49, 50 and 52-57 were rejected under 35 U.S.C. 103(a) as being unpatentable over Grijpma et al. (U.S. Patent No. 5,672,367) in view of Ohara et al. (U.S. Patent No. 5,508,378).

Grijpma et al. is silent with respect to useful molecular weights (M_n) of the biodegradable polymers used. Ohara et al. discloses a method for producing polylactic acid (PLA) having a molecular weight of 200,000 – 500,000. These polymers are intended for technical uses (Column 1, Lines 14-24). The polymers of Ohara et al. have glass transition temperatures between 57.3 °C (Ohara et al., Example 6) and 64 °C (Ohara et al., Example 8).

Applicant respectfully submits that Ohara et al. is not at all relevant with respect to the art of chewing gum and would, as such, not be consulted by the person skilled in the art. If, although contested by the Applicant, the skilled person in the chewing gum art, at the time the invention was made, would have looked into the teachings of Ohara et al., he/she would clearly refrain from considering the taught polymers for use in chewing gum, since they are crystalline technical plastics made from L-lactide and made for particular technical uses and not suitable as chewing gum components.

Amended Claim 1 is limited by the phrase "*Chewing gum comprising ...*" and not directed towards any polymer on its own. Furthermore, independent Claim 50 is directed toward a "*Method for creating a chewing gum....*" Consequently, amended independent claims 1 and 50 and all dependent claims

are non-obvious over Grijpma et al. in view of Ohara et al. and this rejection under 35 U.S.C. 103(a) should be withdrawn.

Li et al.

Claims 1-9, 14-20, 22-26, 28-31, 33, 36-39, 49, 50 and 52-57 were rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (WO 00/19837).

Applicant again wishes to emphasize that the teachings in Li et al. relate to a single commercial polymer mentioned in Li et al., Example 1. The viscosity molecular weight of the polymer in Li et al. is 42,200 g/mol, which implies that the number average molecular weight is even lower as previously stated (Applicant's response to Official Action dated August 5, 2009) and therefore well outside the range of amended Claim 1.

The Examiner states that several embodiments are taught in Li et al. comprising poly (D,L-lactic acid) having molecular weights in the range of approximately 2000 to about 2,000,000 g/mol and 1000 to about 500,000 g/mol.

Although Applicant holds the view that the ranges disclosed in Li et al. are not well defined since the molecular weights are not specified with regard to type

(Mn, Mw, Mv or others) a further limitation is introduced in the currently amended Claim 1 by defining an upper limit for the molecular weight of the biodegradable polymer of 350,000 g/mol Mn. Without knowing for certain, the presently claimed range *may* overlap with or be contained in the ranges stated in Li et al. Still, the ranges claimed in Li et al. remain nonspecific and unclear and do not contain unambiguous information about what is preferable or beneficial.

It would not have been obvious to the skilled person that certain benefits may be obtained by choosing biodegradable polymers with molecular weights in the range specified in the amended Claim 1. On the contrary, Li et al. teaches only one specific example far outside the presently claimed range and does in no way link molecular weight of the polymer to any positive property related to the chewing gum itself. Surprisingly it has been found by Applicant that:

In other words, according to the invention an improved texture of a biodegradable polymer containing chewing gum may in fact surprisingly be obtained by an initial worsening of the rheological properties of the biodegradable polymer and finally be more than compensated by the addition of suitable softeners.

(Present application, page 2, lines 26-29).

Some other benefits of the present invention are cited from the application in Applicant's response mentioned above.

In summary, according to the present invention, the use of softeners is problematic when utilizing biodegradable polymers in chewing gum, as described in the present application on page 2, lines 9-13. To obtain a biodegradable chewing gum with an adequate texture, the Applicant has found that a relatively high molecular weight biodegradable polymer can be combined with softeners, the relatively high molecular weight of the polymer allowing the use of effective amounts of softener, and the softener more than compensating for the intrinsically poor rheological properties of the high molecular weight biodegradable polymer. At the same time, due to the at least one biodegradable polymer, the use of softeners is somewhat restricted, now being specified in the amended Claims 1 and 50.

The skilled person could not by looking in Li et al. arrive at the present invention as no teachings at all in Li et al. point in the direction of the presently amended Claim 1. On the contrary, the teachings of Li et al. favor the use of comparatively low molecular weight biodegradable polymers as evidenced by the examples in Li et al.

Consequently, amended independent Claims 1 and 50 and all dependent claims are non-obvious over Li et al. and this rejection under 35 U.S.C. 103(a) should be withdrawn.

Owusu-Ansah et al. in view of Hosenev

Claims 1-9, 14-19, 21, 28, 29 and 39-41 were rejected under 35 U.S.C. 103(a) as being unpatentable over Owusu-Ansah et al. (U.S. Patent No. 5,424,081) in view of Hosenev (article, Principles of Cereal Science and Technology).

Owusu-Ansah et al. is concerned with the use of gluten as a component in chewing gum. Hosenev teaches that the molecular weight of glutenin may be several million with an average molecular weight of about 3 million. It seems very unlikely, and probably impossible, on the basis of Owusu-Ansah et al. and Hosenev to arrive at a chewing gum comprising a biodegradable polymer with a molecular weight falling within the range of amended Claim 1, since both the gliadin and the glutenin components of gluten do not normally have molecular weights within the claimed range. Accordingly, the skilled person would not arrive at the present invention when reading Owusu-Ansah et al. and Hosenev since the molecular ranges taught in the references give no indication of benefits obtained when keeping molecular weights within the specific range of amended Claim 1. Furthermore, since gluten is a natural product, adjusting gluten's molecular weight is not readily an option or practical and not suggested or taught by the references.

Consequently, amended independent Claims 1 and 50 and all dependent claims are non-obvious over Owusu-Ansah et al. in view of Hoseney and this rejection under 35 U.S.C. 103(a) should be withdrawn.

For the foregoing reasons, Applicant respectfully submits that all pending claims, namely Claims 1, 2, 6, 8, 9, 14-26, 28-31, 33-50, 52, 53 and 56, are patentable over the references of record, and earnestly solicits allowance of the same.

Respectfully submitted,

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